

CLAIMS

What is claimed is:

1. A graft retaining system for retaining a graft in a bone tunnel in a bone, the system comprising:

encircling means for at least partially encircling a portion of the graft, the encircling means positionable adjacent the bone tunnel, the encircling means being movable from a first position in which the graft passes generally straight through the encircling means to a second position in which the graft is forced into a tortuous path through the encircling means such that the graft is gripped by the encircling means; and

securing means for securing the graft and encircling means relative to the bone tunnel with the encircling means in the second position.
2. The graft retaining system of claim 1 wherein the securing means is operable to move the encircling means from the first position to the second position.
3. The graft retaining system of claim 1 wherein the securing means directly engages the graft, the encircling means, and the bone tunnel to secure the graft and the encircling means.
4. The graft retaining system of claim 1 wherein the encircling means comprises a ring having an axis, the ring encircling the graft to grip the graft in belt buckle fashion when the ring is placed in the second position.
5. The graft retaining system of claim 4 wherein the ring comprises a bone engaging portion extending from one side of the ring, the bone engaging portion being engageable with the bone outside of the bone tunnel to form a center of rotation about which the ring can rotate, the ring being rotatable about the bone engaging portion from the first position in

- which the ring axis is generally aligned with the tunnel to the second position in which it is generally transverse to the bone tunnel.
6. The graft retaining system of claim 5 wherein the ring lies within the bone tunnel when in the second position.
 7. The graft retaining system of claim 1 wherein the encircling means directly engages the graft and the bone outside of the tunnel and the securing means directly engages the graft and the bone tunnel.
 8. The graft retaining system of claim 1 wherein the securing means comprises an interference screw.
 9. A graft retaining system for retaining a graft in a bone tunnel, the system comprising:
a first member for gripping the graft, the first member including a portion for at least partially encircling the graft to grip the graft in belt buckle fashion when the first member is rotated relative to the graft ; and
a second member for securing the first member and the graft in the tunnel.
 10. The graft retaining system of claim 9 wherein the encircling portion comprises a cylindrical ring defining a lumen having a lumen axis.
 11. The graft retaining system of claim 10 further comprising a bone engaging protrusion extending radially outwardly from the ring to engage the bone outside of the bone tunnel.
 12. The graft retaining system of claim 11 wherein the protrusion comprises a sharpened prong.
 13. The graft retaining system of claim 12 wherein the prong includes a tip that contacts the bone initially to create a center of rotation and a broad surface that contacts the bone after the first member is rotated.

14. The graft retaining system of claim 11 further comprising a fixation portion extending radially outwardly from the ring to engage the second member.
15. The graft retaining system of claim 14 wherein the bone engaging protrusion is diametrically opposite the fixation portion and the bone engaging portion extends radially and axially outwardly and the fixation portion extends radially and axially outwardly in a direction opposite the bone engaging portion such that the first member is generally "S"-shaped.
16. The graft retaining system of claim 9 wherein the second member comprises an interference screw able to be driven adjacent the first member to engage the first member such that as the screw is advanced it causes the first member to rotate to grip the graft.
17. The graft retaining system of claim 9 further comprising an insertion tool means for gripping the first member and permitting the first member to rotate in a first direction while blocking rotation in a second opposite direction such that the insertion tool means is able to position the first member adjacent the bone tunnel and permit the first member to be rotated to grip the graft.
18. The graft retaining system of claim 17 wherein the first member includes at least one outwardly projecting lug and the insertion tool means includes at least one slot for receiving the at least one lug in pivoting relationship.
19. The graft retaining system of claim 9 wherein the first member comprises a cylindrical ring having a side wall surrounding a central lumen having a lumen axis, the side wall being curved to more closely conform to the bone tunnel wall when the first member is rotated to grip the graft.

20. The graft retaining system of claim 19 wherein a portion of the side wall is axially offset relative to the remainder of the side wall to define an axial curve.
21. The graft retaining system of claim 9 wherein the first member comprises a cylindrical ring having a side wall surrounding a central lumen having a lumen axis, the sidewall lying in a plane transverse to the lumen axis.
22. A graft retaining system for retaining a graft in a bone tunnel formed in a bone, the system comprising:
 - a ring including a cylindrical side wall, the cylindrical wall having an inner surface defining a lumen sized for receiving the graft and an outer surface sized to fit within the bone tunnel, the lumen having a lumen axis;
 - a bone engaging prong extending radially outwardly from the ring;
 - a fixation tab extending radially outwardly from the ring, opposite the prong, for engaging an interference screw; and
 - an interference screw engageable with the fixation tab to secure the ring and graft relative to the tunnel.
23. The graft retaining system of claim 22 wherein the ring is positionable adjacent the bone tunnel, the ring being movable from a first position in which the graft passes generally straight through the ring to a second position in which the graft is forced into a tortuous path through the ring such that the graft is gripped by the ring.
24. The graft retaining system of claim 22 wherein the fixation tab includes a through-slot and a depression adjacent the slot, the depression being engageable with the interference screw.

25. The graft retaining system of claim 22 wherein the side wall lies in a plane transverse to the lumen axis.
26. The graft retaining system of claim 22 wherein a portion of the side wall is axially curved.
27. A method for retaining a graft in a bone tunnel formed in a bone, the method comprising:
 - providing encircling means for at least partially encircling a portion of the graft;
 - positioning the encircling means adjacent the bone tunnel in a first position such that it at least partially encircles a portion of the graft with the graft passing generally straight through the encircling means; and
 - moving the encircling means from the first position to a second position in which the graft is forced into a tortuous path through the encircling means such that the graft is gripped by the encircling means.
28. The method of claim 27 further comprising:
 - providing a securing means for securing the graft and encircling means; and
 - positioning the securing means adjacent the graft and encircling means to secure the graft and encircling means relative to the bone tunnel with the encircling means in the second position.
29. The method of claim 27 wherein the encircling means comprises a lumen for receiving the graft, a prong for gripping the bone outside of the tunnel to create a center of rotation, and a fixation tab for engaging an interference screw, the step of positioning the encircling means adjacent the bone tunnel comprising placing the prong into engagement

with the bone outside of the bone tunnel and placing the graft through the lumen, the method further comprising:

providing an interference screw for securing the graft and encircling means;
positioning the interference screw adjacent the fixation tab; and
driving the interference screw into the bone tunnel to rotate the encircling means about the center of rotation created by the prong such that the encircling means grips the graft and the interference screw grips the encircling means to secure the graft and encircling means relative to the bone tunnel with the encircling means in the second position.

30. The method of claim 29 further comprising:

forming a notch in a portion of the bone tunnel to receive the fixation tab.

31. The method of claim 30 further comprising:

providing a guidewire;

inserting the guidewire into the tunnel adjacent the notch; and

inserting the interference screw over the guide wire to guide the interference screw.